



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,294	06/19/2001	Lonnie O'Neal Ingram	BCI-026	2663
21874	7590	09/07/2004	EXAMINER	
EDWARDS & ANGELL, LLP			MARX, IRENE	
P.O. BOX 55874				
BOSTON, MA 02205			ART UNIT	PAPER NUMBER
			1651	

DATE MAILED: 09/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/885,294	INGRAM ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Irene Marx	1651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 17 August 2004.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,3,4,6,7,9-11,18,19,21-33 and 36-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1, 3, 4, 6-7, 9-11,18-19, 21-33 and 36-42 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____ .

Art Unit: 1651

The amendment filed 8/17/04 is acknowledged. Claims 1, 3, 4, 6-7, 9-11, 18-19, 21-33 and 36-42 are being considered on the merits.

The amendment presented fails to comply with the **Revised Amendment Format 37 CFR 1.121**. At least claim 1 is amended without the appropriate indication of brackets, strike-throughs and/or underlining regarding R1. Correction is **required**.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 3, 4, 6-7, 9-10, 22-27, 30-36 and 38-42 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,130,076.

An obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but an examined application claim not is patentably distinct from the reference claim(s) because the examined claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985).

Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 is generic to all that is recited in the claims of U.S. Patent No. 6,130,076.

That is, claim 1 of U.S. Patent No. 6,130,076 falls entirely within the scope of claim 1 or, in other words, claim 1 is anticipated by claim 1 of U.S. Patent No. 6,130,076. Specifically,

Art Unit: 1651

the production of an alcohol, such as ethanol, by ethanologenic bacteria in a nutrient medium containing hydrolyzed soy or autolyzed yeast of the patent No. 6,130,076 contains at least amino acids as compounds of claim 1 herein, and anticipates the production of an alcohol with an alcohologenic cell in a medium containing one or more amino acids, for example.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3, 4, 6-7, 9-11, 18-19, 21-33 and 36-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is inconsistent and confusing in the recitation of “increasing the production of alcohol from a saccharide source by an alcohologenic cell”, while the body of the claim is directed to “recombinant cell”.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4, 6-7, 9-11, 18-19, 21-33 and 36-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stanley *et al.* (1997) or Stanley *et al.* (1993) taken with Ingram *et al.* (U.S. Patent No. 6,107,093).

The claims are directed production of alcohol with a recombinant cell exposing the cell to at least one compound of a certain formula during while contacting the cell with a saccharide source.

Each of the Stanley *et al.* references discloses a process for producing alcohol with a cell by contacting a medium containing glucose with ethanologenic cells of *Saccharomyces* and contacting the cell with acetaldehyde. See, e.g., Figures 1 and 2; respectively Figure 1. The

production of alcohol is increased, since there is reduced inhibition due to ethanol as evidenced by an increase in growth.

The medium contains yeast extract, which comprises the amino acid glutamate.

The references differ from the claimed invention in the use of recombinant ethanologenic cells, such as the recombinant *E. coli* and *Klebsiella* strains listed in claim 9. However, Ingram *et al.* adequately demonstrates that these microorganisms are old and well known in the art (See, e.g., Tables 2 and 6.). Note also the use of Luria broth in Example 8

Given that acetaldehyde is a precursor of ethanol production, one of ordinary skill in the art would have had a reasonable expectation of success in improving ethanol production by exposing the ethanologenic cells to other intermediates in the metabolic pathways leading to ethanol, such as pyruvic acid, succinic acid and  $\alpha$ -ketoglutarate, particularly in microorganisms wherein metabolic pathways have been altered to divert products of glycolysis to the production of ethanol (See, e.g., Ingram col. 3, lines 42 et seq.).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the process of Stanley *et al.* (1997) or Stanley *et al.* (1993) by exposing ethanologenic cells to other intermediates in the metabolic pathways of an alcohol such as ethanol, including intermediates of the tricarboxylic cycle, such as pyruvic acid, succinic acid and  $\alpha$ -ketoglutarate rather than the precursor acetaldehyde, particularly in ethanologenic cells wherein the metabolic pathways for the production of the alcohol ethanol have been altered, as suggested by the teachings of Ingram *et al.* (U.S. Patent No. 6,107,093) for the expected benefit of providing an increased production of economically useful alcohol by the ethanologenic cells.

Thus, the claimed invention as a whole was clearly *prima facie* obvious, especially in the absence of evidence to the contrary.

#### ***Response to Arguments***

Applicant's arguments have been fully considered but they are not deemed to be persuasive.

To begin with, it is noted that the term "recombinant cell" includes cells that naturally recombine and cannot be interpreted as excluding cells that are not genetically engineered. The

Art Unit: 1651

statements in the specification indicates that “recombinant cell” is intended to include a genetically modified cell and that the cell can be a microorganism or a higher eukaryotic cell. In a preferred embodiment, the cell is a particular ethanologenic bacterial cell. Clearly this statement is not exclusive of naturally recombined cells.

Applicant argument that there is no teaching or suggestion in Stanley to alter the metabolic pathways of *S. cerevisiae* by genetic engineering is irrelevant to the rejection made. Stanley was relied upon to demonstrate that exposure of cells to a compound of formula I for the production of ethanol is well known in the art and the teachings of the rationale for using such a compound. Ingram is relied upon for providing the particular bacterial strains as claimed that are not naturally ethanologenic and which are made by genetic engineering techniques. Counsel appears to argue that the metabolic pathways involved are different. However, the arguments by counsel in this regard are not directly related to the invention as claimed and have not been substantiated with appropriate evidence. It is well settled that arguments by counsel do not constitute evidence.

With regard to the exposure of the cells of Ingram to acetaldehyde, it is noted that Ingram states that in recombinants producing ethanol as a fermentation product, the ethanologenic enzymes divert part of the pyruvate from glycolysis to acetaldehyde and reoxidize NADH to produce ethanol, a less damaging product of metabolism (col. 20, lines 36 et seq.). This statement is seen as clearly suggesting that acetaldehyde is less damaging than pyruvate to the cells, and that it is well tolerated by genetically engineering cells such as *E. coli* and *Klebsiella*.

Therefore, one of ordinary skill in the art would have expected at the time the claimed invention was made that at least exposure to acetaldehyde, an intermediate recognized by the Ingram reference to be tolerated by recombinant cells, including specific enteric cells, would increase ethanol production in some amount, since a lesser metabolic effort is required to bioconvert acetaldehyde to ethanol than to bioconvert a saccharide.

Therefore the rejection is deemed proper and it is adhered to.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irene Marx whose telephone number is (571) 272-0919. The examiner can normally be reached on M-F (6:30-3:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Irene Marx*  
Irene Marx  
Primary Examiner  
Art Unit 1651